UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,307	06/23/2003	Masumi Kubo	4034-36	7959

23117 7590 01/18/2007
NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER	
VU, PHU	

ART UNIT	PAPER NUMBER
2871	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/18/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/601,307	KUBO ET AL.	
	Examiner	Art Unit	
	Phu Vu	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 16-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 16-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-13 and 16-20 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-13 and 16-19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kubo US Publication No. 2002/0036740 in view of Kim US Patent No. 6577366 and further in view of Kim et al. US Patent No 6342876.

Regarding claims 1, 3, 4 and 6-8, Kubo teaches liquid crystal display device, comprising: a first substrate (fig. 1B element 100a); a second substrate (100b); and a liquid crystal layer (3) provided between the first substrate and the second substrate, wherein: a plurality of picture element regions (see fig. 9A) are defined each by a first electrode (fig. 1B and 9 elements 14b and 14b') provided on one side of the first substrate that is closer to the liquid crystal layer and a second electrode (fig. 1B element 22) provided on the second substrate so as to oppose the first electrode via the liquid crystal layer therebetween; the first electrode includes, in each of the plurality of picture element regions (see fig 9), a plurality of unit solid portions (fig. 9 14b and 14b') arranged in a first direction , whereby the liquid crystal layer takes a vertical alignment

(see abstract) in the absence of an applied voltage between the first electrode and the second electrode, and forms a plurality of liquid crystal domains (see abstract) in the plurality of unit solid portions of the first electrode by inclined electric fields produced around the plurality of unit solid portions in response to a voltage applied between the first electrode and the second electrode, each of the plurality of liquid crystal domains taking a radially-inclined orientation (see abstract); the plurality of picture element regions are arranged in a matrix pattern (see fig. 9) including a plurality of rows (see fig. 9) extending in the second direction different from the first direction and a plurality of columns extending in the first direction (see fig. 9). Kubo also teaches the first substrate including a plurality of open regions that do not overlap with the first electrode, and a when voltage is applied between the first electrode and the second electrode, the liquid crystal layer forms a plurality of additional liquid crystal domains in the plurality of open regions by inclined electric fields, each of the additional liquid crystal domains taking a radially inclined orientation (see [0008]).

Kubo fails to teach a polarity of a voltage applied across the liquid crystal layer in a first picture element region among the plurality of picture element regions is different from a polarity of a voltage applied across the liquid crystal layer in a second picture element region among the plurality of picture element regions that belongs to the same row as that of the first picture element region and belongs to a column adjacent to a column to which the first picture element region belongs in each frame and wherein the polarity of voltage applied across the LC layer in a plurality of picture element regions belonging to one column among the plurality of picture element regions is reversed for

every n rows (where n is an integer of 1 or more) in each frame and wherein a polarity of voltage applied across the liquid crystal layer in a third picture element belongs to the same column as that of the first picture element region and belongs to a row adjacent to a row in which the first picture element belongs in each frame.

The above references fail to teach a plurality of unit solid portions arranged only in a first direction however, Kim teaches a patterned vertically aligned LCD with unit solid portions arranged only in a first direction (see cover figure element 14) to reduce the area covered by the gate line thereby increasing aperture ratio and provides a larger margin for pixel alignment (see column 1 lines 55-56 and column 1 lines 60-63). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to form a vertically aligned LCD with unit solid portions arranged in only one direction to increase aperture ratio through reduction in gate line area and provide a larger margin for pixel alignment.

Kim US Patent 6342876, discloses a polarity of a voltage applied across the liquid crystal layer in a first picture element region among the plurality of picture element regions is different from a polarity of a voltage applied across the liquid crystal layer in a second picture element region among the plurality of picture element regions that belongs to the same row as that of the first picture element region and belongs to a column adjacent to a column to which the first picture element region belongs (see figure 9C and 9D) and also teaches the polarity of voltage applied across the LC layer in a plurality of picture element regions belonging to one column is reversed from every N rows where N is 1 or greater (see fig. 9C and 9D). Kim also teaches the polarity of

voltage applied across the LC layer in the first picture element region is different from the LC polarity of a voltage applied across the LC layer in a third picture element that belongs in a same column as that of the first picture element region and belongs to a row adjacent to a row to which the first picture element region belongs in each from (see fig. 9C and 9D). Kim teaches that this driving scheme suppresses flicker and improves aperture ratio, which leads to and improved picture quality (contrast) (see column 5 lines 19-41). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to apply the polarity inversion driving technique of Kim to suppress flicker, improve aperture ration and improve contrast and picture quality.

Regarding claim 2, Kubo teaches the plurality of picture element regions each have a shape whose longitudinal direction is defined in the first direction and whose width direction is defined in a second direction (see fig. 9).

Regarding claim 5, the primary reference discloses unit solid portions have rotational symmetry (see fig. 9 element 14b and 14b').

Regarding claims 9 -12, Kubo teaches the second substrate includes a region corresponding to one of the plurality of liquid crystal domains, an orientation-regulating protrusion that exerts an orientation regulating force for orienting liquid crystal molecules in at least one liquid crystal domain into a radially inclined orientation at least in the presence of voltage that appears to be in a region in the center of at least one domain that orients the liquid crystal layer in the absence of voltage ([0241] and see fig. 30 element 24 and see fig. 32).

Regarding claim 13, the protrusion defines the thickness of the LC layer because it extends into the LC layer (see fig. 30 element 24) therefore the LC layer will thinner where the protrusion is.

Regarding claims 16 and 17, the primary reference teaches the open regions having rotational symmetry and circular shape (see claim 1 rejection).

Regarding claim 18, claim 1 includes all the limitations of claim 18 except aside surface of the protrusion exert an orientation regulating force of the same direction of orientation regulation by the inclined electric field however Kubo teaches this (see [0015]).

Regarding claim 19, the primary reference teaches a plurality of switch elements ([0044]) for a plurality of picture element regions, and the first electrode comprises a plurality of picture element electrodes (fig. 1B14b 14b') provided respectively for the plurality of picture element regions and the first electrode comprises a plurality of picture element electrodes ([0044]) provided respectively for the plurality of picture element regions and the second electrode ([0044]) is at least one counter electrode opposing the plurality of picture element electrodes.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kubo US 20020036740 (Kubo A) in view of Kim US Patent No. 6577366 in view of Kim US 6342876 and further in view of Kubo 20020075436 (Kubo B).

Regarding claim 20, Kubo A discloses all the limitations of claim 20 except, at least on protrusion extending all the way across the liquid crystal layer such that it contacts the first and second substrates. Kubo B teaches a domain defining member

that extends all the way across the liquid crystal layer such that it contacts the first and second substrate in order to combine domain defining function that further acts as a spacer (see [0286]). Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to apply a domain defining member that extends to between the first and second substrates such that it contacts both to providing spacing between the substrates as well as orient the liquid crystals.

Conclusion

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu Vu whose telephone number is (571)-272-1562. The examiner can normally be reached on 8AM-5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571)-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phu Vu
Examiner
AU 2871

ANDREW SCHECHTER
PRIMARY EXAMINER